Biometric Processes
of the Entry Exit System (EES)

Agenda

1. Basics of the EES: Biometrics and Technical Components

2. Challenges of the EES

3. BSI Solution: Technical Guideline TR-03121

Basics of the Entry Exit System

Biometrics
Technical Components

Biometrics within the EES

- four fingerprints of the right hand (if available)
- high-quality facial image
- MS defines leading modality for verification
- quality assurance
  - fingerprints → NFIQ 2
  - facial images → ?

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Technical Components of the EES

The EES regulation utilizes different
types of border control systems:

- manual border control
- self-service kiosks
- e-gates
- automated border control
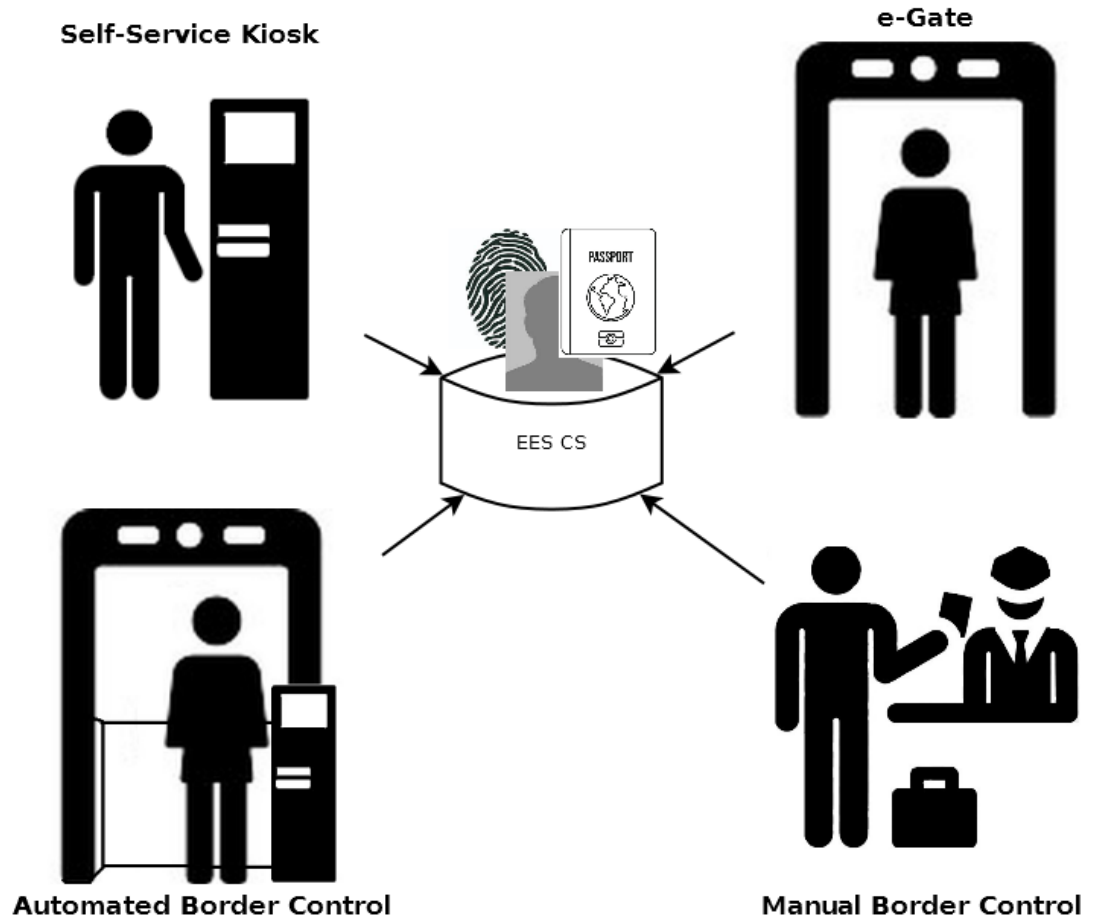
Example: Self-Service Kiosks

- self-service kiosks acquire information and biometrics (according to traveler type)

- pre-captured data are available at manual border control
  - border guard can use
    pre-captured biometric images
  - verification/identification results
    are already present
  - saving of time at
    manual border control

- prone to presentation attacks
- utilize PAD and surveillance pictures
  (e.g. of fingerprints)
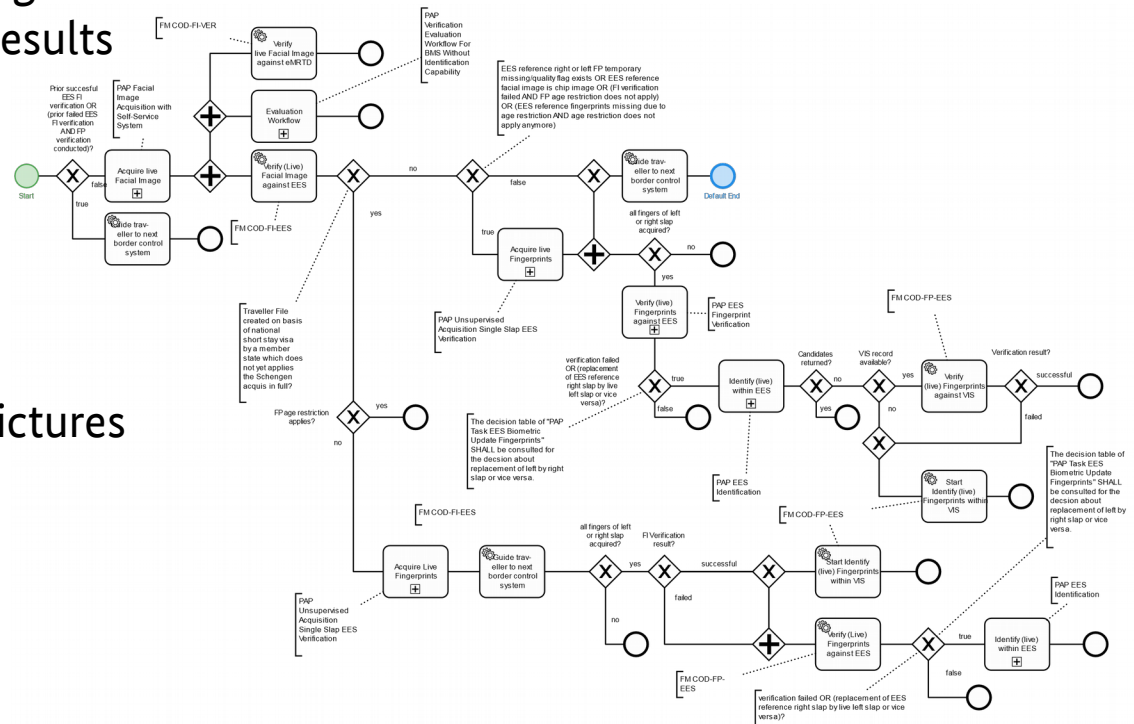
Technical Components
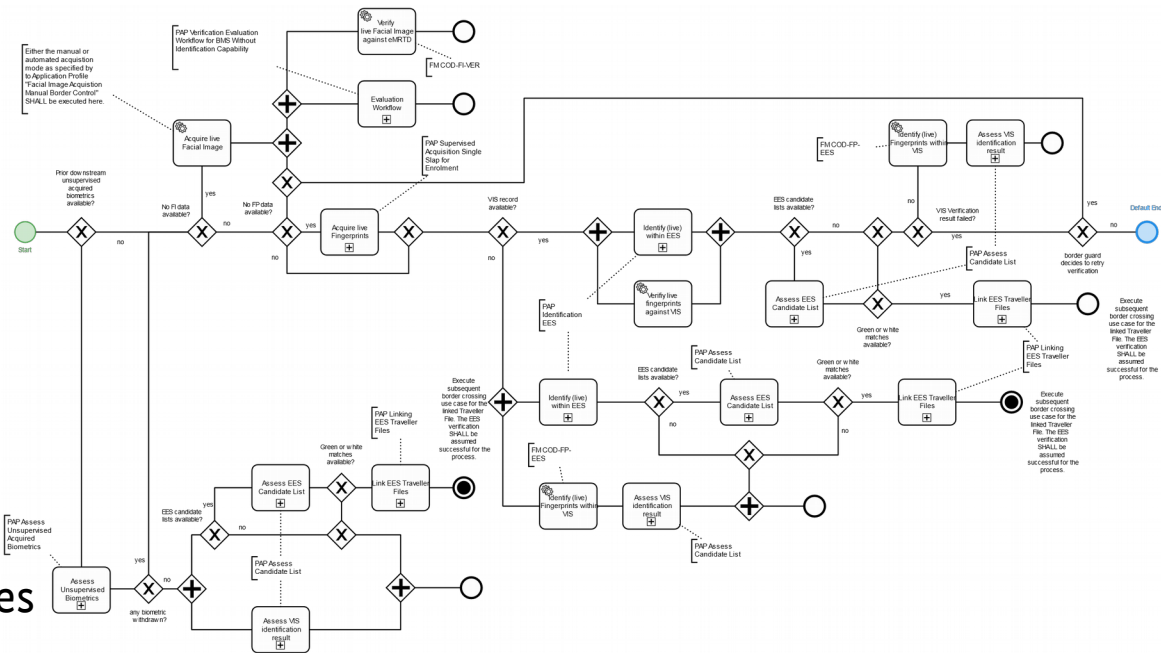
Border Control in Germany

- Germany utilizes ABC (EasyPASS) since 2014 (facial image)
- border control application (comparison of fingerprints against passport references)

Challenges of the EES

Challenges

complex biometric processes and new biometric use cases

current challenges:
- missing test data
- multimodal identification
- different biometric components and procedures

Technical Guideline TR-03121 – Biometrics for Public Sector Applications – Part 3 - Volume 1: Border Control

Technical Guideline TR-03121

Part 3 - Volume 1: Border Control

- BSI publishes the technical guideline (TR) „Biometrics for Public Sector Applications"
  to cover biometric processes in Germany
- definition of new requirements for hardware and software, e.g. equip self-service
  kiosks to withstand presentation attacks, use of surveillance
- basis for certification of (public) biometric systems within Germany
- furthermore: TR can be used by any Schengen MS

proposed solutions
- modular approach
- update of biometrics, e.g. due to aging, poor quality etc.
- evaluation of system performance
- harmonization of biometric processes (workflow engine)

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Modular configuration of EES procedures: Overview

- EES allows for different technical components and traveler types
- MS utilize different border control procedures (classical and "modern" ones, e.g. mobile scenarios)

→ TR defines modular application profiles which can be compiled individually to meet all national needs
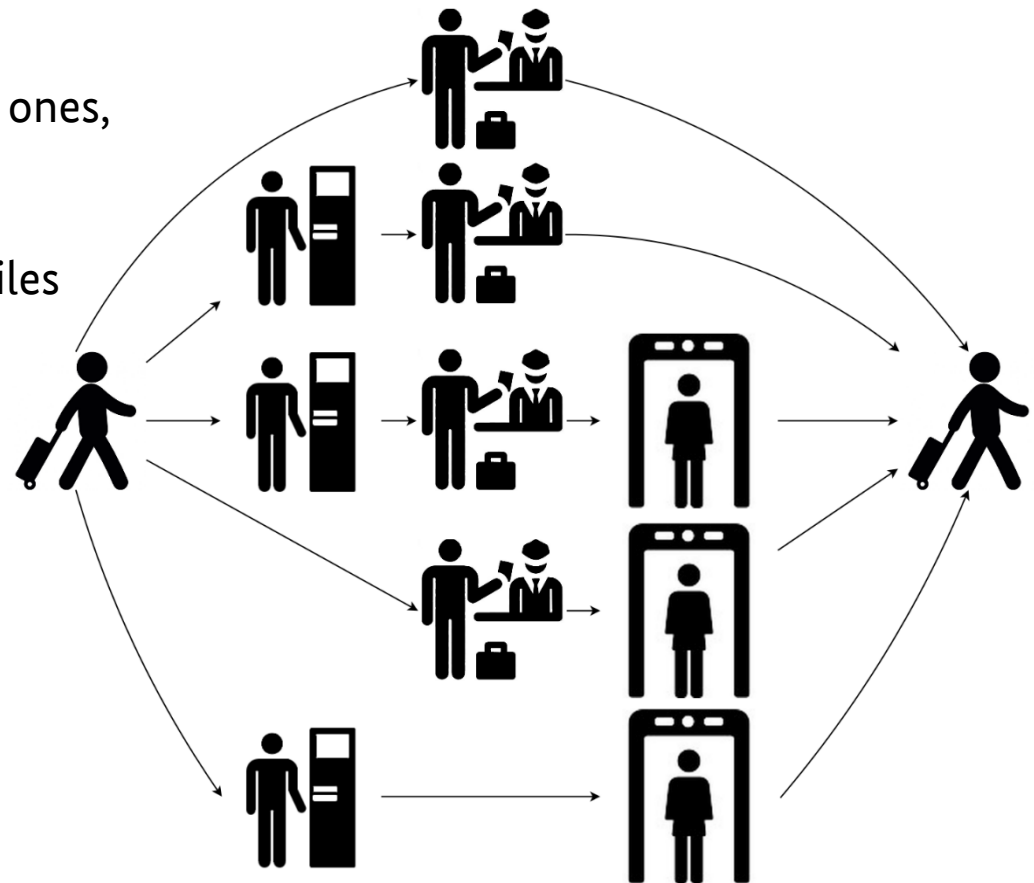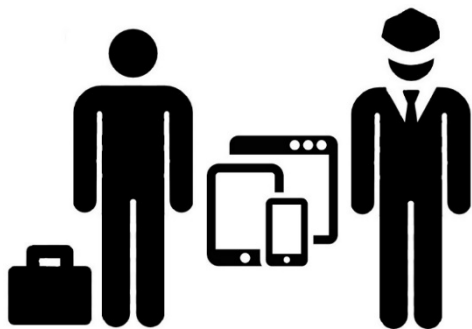
Update Process of Biometrics

- EES regulation requires updates of biometrics due to different reasons
  - outdated
  - poor quality
  - temporarily missing (fingerprints only)

- procedure is not specified
  - different specifications are possible
  - the solution must be the same for all MS
  - especially the replacement of fingerprints is complex, due to temporarily missing fingers/hands

→ TR covers all possible cases with best practice solutions

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Evaluation of Biometric Performance

- biometric systems are controlled by thresholds and error rates
- important values for border systems
  - usability: False-Non-Match-Rate (FNMR)
  - Security: False-Match-Rate (FMR)

- FNMR and FMR must be monitored continuously to keep the system efficient
- implementing act defines an evaluation workflow
- TR describes necessary procedures

Workflow Engine

- atomic operations
    - single purpose
    - specific order
    - accumulated response time

- workflow engine
    - parallel and combined operations
    - minimize transaction time and human interaction

- border control transaction with cache

Summary

- The future EES
    - complex processe
    - different technical components
    - new in many aspects

    - many challenges to tackle
    - addressed in TR-03121

Thank you!

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Further Reading

- Schengen Borders Code (SBC) EU 2016/399, 9 March 2016
  https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0399

- EES amendments to SBC EU 2017/2225, 30 November 2017
  https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ:L:2017:327:TOC
  &uri=uriserv:OJ.L_.2017.327.01.0001.01.ENG

- EES regulation EU 2017/2226, 30 November 2017
  https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R2226

- BSI TR-03121, Biometrics for Public Sector Applications
  http://www.bsi.bund.de/EN/publications/TechnicalGuidelines/TR03121/BSITR03121.html

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